

## Southwest Transmission Cooperative

### Arizona Cooperative Grid Modernization Project

#### Abstract

The Arizona Cooperative Grid Modernization Project upgrades electric infrastructure for three electric cooperatives in Arizona. Southwest Transmission Cooperative (SWTC) is the primary recipient of the project. The project also includes two distribution system cooperatives, Mohave Electric Cooperative (MEC) and Sulphur Springs Valley Electric Cooperative (SSVEC), which receive transmission service from SWTC. SWTC is upgrading the communications infrastructure of their transmission network by installing optical ground wire cables between several substations. The project also installs micro-processor-based protective relays and equipment monitors. MEC is replacing thousands of existing meters in its service territory with smart meters and is expanding the communications network and power line carrier-based meter communications system. SSVEC is implementing advanced metering infrastructure (AMI) and distribution automation. SSVEC is expanding its existing fiber optic communication infrastructure and upgrading its monitoring software as well.

#### Smart Grid Features

**Communications infrastructure** is being upgraded for all three utilities to integrate the grid operators' information technology systems with the network of sensors and collectors distributed throughout the system. MEC is installing fiber optic lines between substations and the MEC operating center. SSVEC is installing an optical ground wire fiber optic-based communication network to transfer meter and distribution automation data to their control room. This new communications infrastructure is intended to optimize energy delivery and system reliability by providing more rapid and precise information for monitoring transmission and distribution systems.

**Advanced metering infrastructure** includes capabilities for automated meter reading, improved meter accuracy, enhanced outage response and notification, and improved theft of service detection. Both distribution cooperatives are installing AMI. AMI features, such as outage and restoration notification and a remote service switch, are targeted to enable MEC to respond to outages and customer requests more efficiently. SSVEC is replacing thousands of existing customer meters with smart meters that

#### At-A-Glance

**Prime Recipient:** Southwest Transmission Cooperative

**State:** Arizona

**NERC Region:** Western Electricity Coordinating Council

**Total Budget:** \$64,488,970

**Federal Share:** \$32,244,485

**Key Partners:** Mohave Electric Cooperative, Sulphur Springs Valley Electric Cooperative

**Project Type:** Advanced Metering Infrastructure  
Customer Systems  
Electric Distribution Systems  
Electric Transmission Systems

#### Equipment

- 49,250 Smart Meters
- AMI Communication Systems
  - Meter Communications Network
  - Backhaul Communications
- Distribution Automation Equipment for 107 Out of 150 Distribution Circuits
  - Distribution Automation Communications Network
  - Automated Distribution Circuit Switches
  - Automated Voltage Regulators
  - Remote Fault Indicators
  - Equipment Health Sensor
  - Smart Relays

#### Time-Based Rate Programs

- Time of Use

#### Key Targeted Benefits

- Reduced Operating and Maintenance Costs
- Reduced Electricity Cost for Customers
- Improved Electric Service Reliability and Power Quality
- Reduced Costs from Equipment Failures and Theft
- Deferred Investment in Generation Capacity Expansion

**Southwest Transmission Cooperative** (continued)

include interval load data for more precise consumption tracking and more rapid information feedback. Operational cost savings are being targeted by both MEC and SSVEC based on lower meter reading and customer service costs. More precise data on peak electricity usage improves load forecasting and capital investment planning.

**Advanced electricity service options** by SSVEC include additional information services and energy management options provided to customers through pilot programs. This project is undertaking pilot deployment of energy management systems, home area networks, and in-home displays. These enhancements facilitate two-way information feedback between customers and the utility and enable customers to better manage their electricity use and costs.

**Time-based rate programs** are under development by MEC and SSVEC. MEC and SSVEC currently offer time-of-use rates, but these rates are not widely used. With AMI, MEC and SSVEC expect to increase participation in the time-of-use rate programs. The pricing options are designed to encourage customers to reduce and/or shift their consumption from on- to off-peak periods, thereby reducing peak demand.

**Distribution automation systems** include advanced automated equipment to improve reliability and to reduce line losses of the distribution system. SSVEC is deploying automated switches and regulators, remote fault indicators, transformer monitors and smart relays to all 107 of its distribution circuits. These upgrades provide more rapid and effective responses to grid disturbances, reduce the frequency and duration of outages, and reduce operations and maintenance costs.

**Advanced transmission systems** include protective transmission relays that are upgraded to new solid-state devices and replace existing electromechanical equipment. The new relays automate many of the protective functions and create detailed digital reports on power interruption events. This enables grid operators to respond more quickly to transmission grid disruptions and increase the overall reliability of electric delivery.

**Timeline**

| Key Milestones                               | Target Dates |
|--|--------------|
| SWTC – Communications infrastructure start   | Q1 2010      |
| SWTC – Communications infrastructure finish  | Q2 2013      |
| SWTC – Substation automation start           | Q3 2009      |
| SWTC – Substation automation finish          | Q2 2013      |
| MEC – AMI implementation start               | Q1 2010      |
| MEC – AMI implementation finish              | Q3 2012      |
| MEC – Enhanced data management system start  | Q1 2010      |
| MEC – Enhanced data management system finish | Q3 2011      |
| SSVEC – AMI implementation start             | Q3 2009      |
| SSVEC – AMI implementation finish            | Q2 2013      |
| SSVEC – Communications infrastructure start  | Q3 2009      |
| SSVEC – Communications infrastructure finish | Q2 2013      |

**Contact Information**

Bill Riley  
Manager of Transmission Operations and Maintenance  
Southwest Transmission Cooperative  
briley@swtransco.coop

Tom Spence  
Manager of Technical Services  
Southwest Transmission Cooperative  
tspence@swtransco.coop